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ABSTRACT

A study examined an approach to assisting students in increasing their awareness of the organization and demands of text during the survey process of SQ3R (Survey, Question, Read, Review, Recite). Twenty-seven college freshmen in a developmental reading course, were (1) introduced to the concept of SQ3R, (2) given instruction on types and uses of organizational aides in content area textbooks, (3) taught to inventory presence and absence of visual and instructional aids, and (4) involved in self-questioning by responding to alternate forms (recognition/recall) of a questionnaire that focused on presence and absence of aids and the selection of study strategies to use in a content area text chapter. Results showed that repeated trials of the self-questioning approach enhanced awareness of organizational aids in content area texts. In addition, there was a significant transfer of accuracy in responses from the recognition questionnaire to the recall questionnaire, and subjects' awareness of organizational aids in texts was maintained and improved with repetition of the procedure. Although subjects who were more accurate in their awareness of the presence or absence of organizational aids chose active study strategies more often than did those who were less accurate, the effectiveness and diversity in appropriate strategy selection increased for both groups. (FL)

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# Recognition to Recall: Self-Questioning to Enhance Students' Metacognition of Organization and Demands of Text

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Recognition to Recall: Self-Questioning to Enhance Students' Metacognition of Organization and Demands of Texts


## Abstract

The study examined an approach to assisting students in increasing awareness of organization and demands of text during the survey process of SQ3R. The subjects, 27 college freshmen in a developmental reading course, were first introduced to the concept of SQ3R; second, given instruction on types and uses of organizational aids in content area texts; third, taught to inventory presence and absence of visual and instructional aids; fourth, involved in self-monitoring by responding to alternate forms of a study questionnaire, recognition/recall, focusing on presence and absence of aids and the selection of study strategies to be applied to a content area text chapter. The questionnaire was applied to eight content area chapters which subjects were required to study. It was hypothesized that a) students' ability to recognize specified target details would transfer to ability to recall details in response protocols, b) the frequency of selection of active study strategies would increase among high and low scorers, and c) students would show substantial evidence of executing self-selected strategies. The results support the use of the self-questioning approach.

## The Use of Self-Questioning to Enhance Students' Metacognition of the Organization and Demands of Texts

The organization and demands of content area texts require that students approach the tasks of reading and studying in ways which will not only lead to effective comprehension, but also lead to the appropriate selection of strategies for effective test-taking preparation. At all levels, middle-school through college, students need a) to be aware of the organizational aids provided within texts b) to be equally aware of the absence of aids which might be useful in studying the content of the text and c) as a result, be able to determine which strategies they might select to optimize their efficiency in completing the tasks of reading and studying content area materials. Essentially, it would seem to be more advantageous to the reader to develop a generalizable approach to this initial process of awareness, since the organization and demands of texts vary across and within content areas.

Although researchers and theorists have indicated that reading for comprehension and memory are most sucessfully accomplished through active rather than passive processes (Andre & Anderson, 1978-1979; Taylor & Berkowitz, 1980), there has been little exploration of ways in which reading as an active process can be developed and monitored by students and teachers in its most initial phase -- the survey procedure. Samuels (1976) indicates that "in learning

complex skills, mastery of subordinate units must precede final goal attainment." For many years, the SQ3R procedure has been an exceedingly popular reading/study skills approach to mastering content material. However, when students learn to survey, question, read, review, and recite, it is not necessarily evident at the outset, the survey phase, that they are actually aware of all that a content area text has to offer in terms of visual and instructional aids. Nor is it clearly evident that they have taken into account the lack of specific aids which might be useful in a given piece of content area material.

Once students are taught to survey a chapter as the first step in reading a text, this process remains essentially passive. The reader may silently read the first and last paragraph of a text chapter and skim the headings and subheadings without actually taking note of the availability and utility of a variety of organizational aids such as maps, charts, diagrams, tables, pictures with captions, glossaries, introductory objectives, summaries, review questions, italics or bold print, footnotes, and bibliographies.

At the initial phase of surveying text material, metacognitive awareness of the presence or absence of various visual and instructional aids can be considered a critical factor in the engagement of an active rather than passive process. According to Flavell (1976) metacognition

is "the active monitoring and consequent regulation and orchestration of processes in relation to the cognitive objects on which they bear, usually in the service of some concrete goal or objective." Thus, early awareness of the organizational aids in text can serve to engage the reader in meaningful and useful manipulation of the text at the outset of the reading/study task.

Flavell explains that an individual is engaged in metacognition if, for example, "it occurs to them that they had better scrutinize every alternative in any multiple-choice type task situation before deciding which is the best one . . . if they sense that they had better make a note of [something] because they may forget it, or if they think that they should ask someone about [something] to see if they have it right." These general types of thought processes can be considered analogous to the task specific reading/study processes of scrutinizing the presence or absence of organizational aids in texts before deciding which might be the appropriate study strategies to employ; deciding to use such note-taking strategies as annotating or creating a glossary, so as not to forget important concepts; or deciding to question the author's headings and subheadings or to quiz a study partner on the meanings of headings and subheadings to test or to achieve mastery of the content. The importance of this type of focus is supported by Flavell's (1970) more general statement that

"people's awareness of cognitive processes enables them to modify their processing activities to fit their goals."

The purpose of this study was to examine an approach to assisting students in increasing their awareness of the organization and demands of text during the survey process of the SQ3R techniques. First, students were introduced to the concept of SQ3R. Second, students were given instruction on the types and uses of organizational aids (visual and instructional) which appear in content area texts. Third, the survey procedure was applied to a content area chapter for the traditional purposes (reading introduction, conclusion, and skimming headings and subheads) and, in addition, for the purpose of taking inventory of visual and instructional aids. Fourth, students responded to a study questionnaire designed to direct their focus to the presence or absence of organizational aids and to choosing from a variety of alternative study strategies. Finally, the process of surveying content area chapters and responding to alternate forms of a study questionnaire was repeated several times in transition from multiple-choice, true/false (recognition) to short-answer, fill-in (recall) responses.

The primary focus of the study questionnaires -- answering questions about the aids available in a text -- was designed for the purposes of a) enhancing students'

The second question was the extent to which high and low scorers chose more appropriate or less appropriate, active rather than passive, study strategies. It was hypothesized that high scorers would choose active strategies more often than low scorers. Since students were asked to answer questions about the presence and absence of organizational aids in texts, it was expected that those who were more sensitive to both conditions would choose active strategies more often to compensate for the absence of certain organizational aids. There has been much research on the effectiveness of various study strategies (Taylor, 1982; Meyer, Brandt, Bluth, 1980; Bartlett, 1978; Dansereau et al., 1979; Vaughn, 1982; Armbruster & Anderson, 1980) but very little attention to students' effectiveness in selecting study strategies.

The third research question was the effect of the treatment procedure on students' actualization of self-selected study strategies after several repetitions. It was hypothesized that students would execute at least two of either three or four strategies that they were asked to choose as appropriate in preparation for tests on the content of the texts.

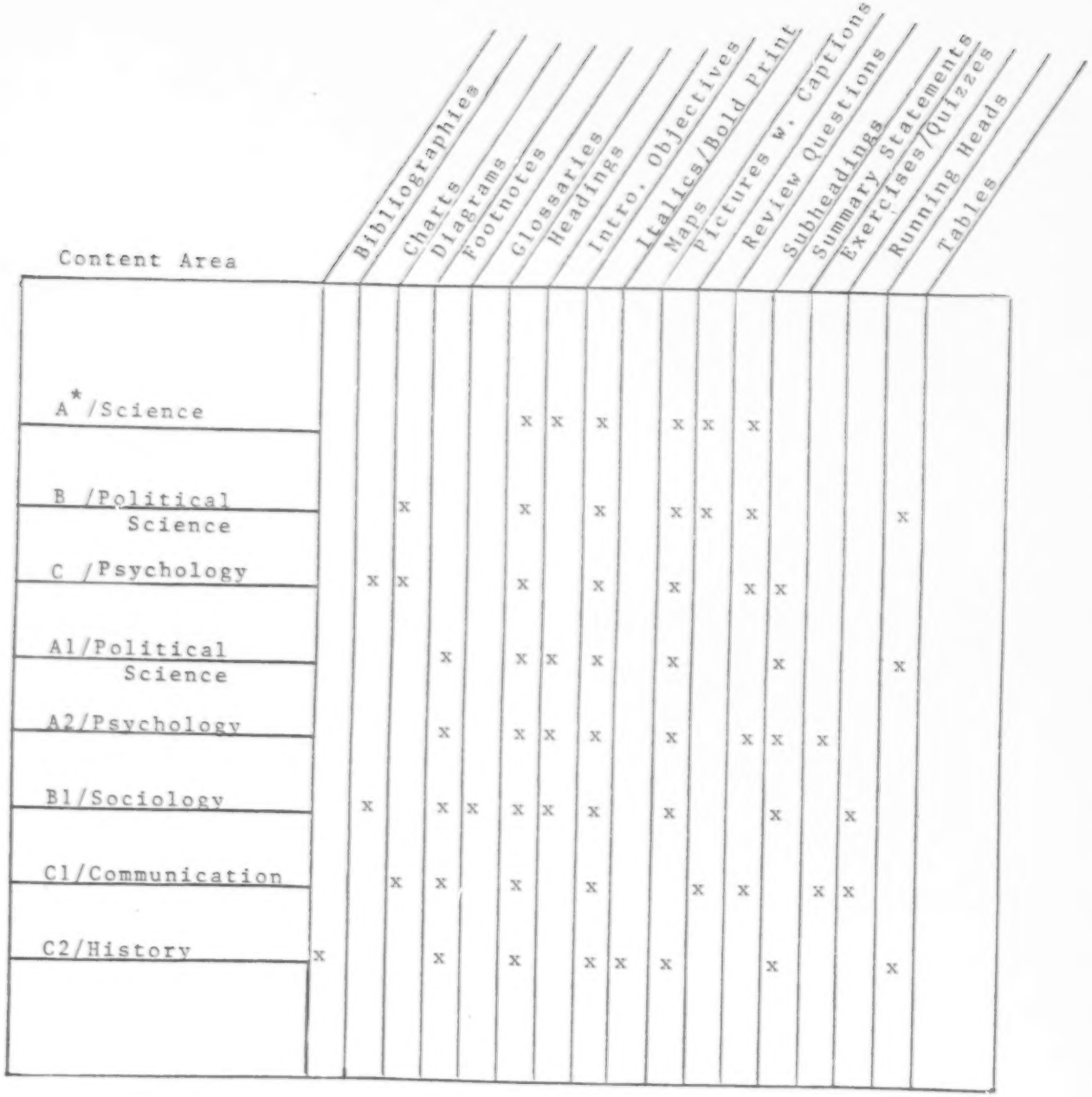
## Method

### Subjects

The subjects in this investigation were 27 freshmen students enrolled in a developmental reading course at a university in the Southeast. The range of reading ability levels was 4.1 to 12.2 as indicated by scores on the Nelson Reading Skills Test (1977) which was administered two weeks before instruction for the survey procedure began. In the first academic quarter, 27 subjects were involved. In the second academic quarter, 25 subjects were involved. The number of respondents to each questionnaire also varies due to absence when the text material was distributed. (It was more desirable to maintain consistency of exposure time for the survey procedure and time for responding to the instruments.)

### Materials

Content area text chapters taken from physical science, political science, sociology, history, and communications textbooks were used in the study. Across subject areas, each chapter contained a variety of organizational aids, and no two chapters within the same domain provided exactly the same types of aids. For example, of the two political science chapters, neither text provided summaries, glossaries, or bibliographies; both used



| Content Area | Bibliographies | Charts | Diagrams | Footnotes | Glossaries | Headings | Intro. Objectives | Italics/Bold Print | Maps | Pictures w. Captions | Review Questions | Subheadings | Summary Statements | Exercises/Quizzes | Running Heads | Tables |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A*/Science | | | | | x | x | x | | x | x | x | | | | | |
| B /Political Science | | | x | | x | | x | | x | x | x | | | | x | |
| C /Psychology | | x | x | | x | | x | | x | | x | x | | | | |
| A1/Political Science | | | | x | x | x | x | | x | | | x | | | x | |
| A2/Psychology | | | | x | x | x | x | | x | | x | x | x | | | |
| B1/Sociology | | x | | x | x | x | x | | x | | | x | | x | | |
| C1/Communication | | | x | x | x | | x | | | x | x | | x | x | | |
| C2/History | x | | | x | x | | x | x | x | | | x | | | x | |

Table 1 Organizational Aids Present in Chapters

(* A,B, or C indicate instructional cycle and form of questionnaire used)

italics, pictures with captions, and tables; one presented diagrams and the other provided review questions. (See Table 1) The text chapters were a standard component of the developmental course. Students were informed that they would be tested on the content of the chapters and the texts were used to teach a wide variety of study strategies in addition to the SQ3R method.

Instruction

Instruction was initiated with a traditional introduction to the SQ3R concept, a discussion of what each component of the acronym represents, and an explanation of the survey procedure. The survey procedure was described as one which involves reading the first and last paragraphs of a chapter and skimming from beginning to end of the material to take note of headings and subheadings. In addition, identification of the various types of organizational and instructional aids was elicited from the students as they skimmed a sample article. The types of aids were listed and copied by students as follows: headings, subheadings, bibliographies, charts, diagrams, footnotes, glossaries, introductory objectives, italics, maps, pictures with captions, review questions, and summary statements. Some of these types were identified by subjects spontaneously and others were prompted by the instructor's reference to specific content areas. Students were then asked to

consider and discuss the possible study strategies that could be applied to particular types of texts and to decide which might be most appropriate according to aids present or absent from each type of content area in question.

Following the introduction to the survey concept of SQ3R, and the discussion of specific organizational aids and possible study strategies, students received their first content area chapter for study. The group was given ten minutes to apply the survey procedure and five additional minutes to respond to a "Study Questionnaire" designed to direct the subjects to focus on the organization and demands of the text. The questionnaire was also designed to measure accuracy and perceptions in completion of the task. The use of the questionnaire was repeated each time that a new content area chapter was distributed to the group for study -- three times in the first academic quarter and five times in the second academic quarter -- once every two weeks.

Measurement

The teaching/assessment instrument consisted of three study questionnaires varying in format from true/false and multiple choice on Form A to fill-in and short answer on Forms B and C. Each of the questionnaires was designed to tap the students' awareness of the presence or absence of various visual and instructional aids within the text chapters. Each form also required that the student indicate

a choice of study strategies to be applied to the text in question. The transition in format from Form A to Form C items required that responses progress from recognition conditions to recall conditions.

Form A consisted of 12 true/false items under the heading "Study Questionnaire" which were designed t probe: the students' awareness of the presence or absence of many technical terms, subheadings, glossaries, introductory overviews or objectives, summaries, and italics; perception of the need to scrutinize the contents more or less carefully, according to relative difficulty; and judgement of whether the material is presented from a common sense or highly specialized frame of reference. Under a second heading, "Study Goals," 3 additional multiple choice items were included which required the student to indicate a choice of study strategies to be applied to the tasks of remembering definitions of terms, remembering the relationships between concepts, and preparing for anticipated essay questions on tests. The task of completing Form A relied mainly upon <u>recognition</u>.

Form B was composed of 5 fill-in and short answer items. Four of the short answer items required details of two to four responses per item (a,b,c,d). Thus, the questionnaire required an actual total of 13 specific responses. The questions were designed to probe: the students' perceptions of the differences between the

organization and style of a current chapter and one previoulsy studied; identification of study aids included in the text; identification of aids included in the current text which were not present in the previous text; and identification of aids not included. Unlike Form A, this form asked students to list three steps or study strategies (a,b,c) that they would use in preparation for a test on the content of the text. The task of completing Form B relied more upon recall than recognition. Although item 1a,b,c,d provided clues to categories of possible responses for filling in a,b,c and d, in a lead-in open-ended question, all of the other items required recall responses.

Form C contained 5 open-ended short answer or fill-in items. This form was also designed to probe the students' perceptions of the difference between the organization and style of a current chapter and the one previously studied; identification of visual or organizational aids included in the text; identification of aids not included in the text; and identification of types of concepts or information which particularly need to be remembered. Students' were requested to list four steps or strategies (a,b,c,d) that they would use in preparation for a test on the content. Three of the items were strictly open-ended in format, requiring no specific number of responses. One item contained two blanks for fill-in responses. The last item required four short answer

responses labeled a,b,c,d for listing the chosen study strategies. Thus, Form C required at least 9 specific responses, but, since students were instructed to be as thorough as possible, the number of additional responses permitted was unlimited. The task of completing Form C relied mainly upon recall.

Scoring Procedure

At the beginning of each instructional cycle -- distribution of a new content area chapter -- the "Study Questionnaire" was used to determine treatment effects. Responses to Form A were analyzed to determine students' accuracy in recognition of the organizational aids provided in texts and students' perception of appropriate study strategies for specified tasks. Responses to Forms B and C were analyzed to determine students' recall of types of organizational aids, accuracy in identifying the presence or absence of such aids in text, and perception of appropriate study strategies according to individual judgements of the demands of the texts.

In the first academic quarter, there were three instructional cycles, three different content area chapters were studied. Form A (recognition), B and C (recall) were each administered once. In the second academic quarter, there were five instructional cycles; five different content area chapters were studied. At the beginning of the first

cycle, the introductory lesson on surveying and identification of organizational aids was briefly reviewed. In this sequence, Form A (recognition) was administered upon distribution of the first two chapters; Form B (recall) for the third chapter; and Form C (recall) for distribution of the forth and fifth chapters.

The scoring of Form A involved two main procedures. The first section of Form A, headed "Study Questionnaire" and consisting of 12 true/false items, was assigned one point for each item which corresponded to a predetermined answer key. The second section of Form A, headed "Study Goals," consisted of three multiple choice items which were all considered correct. The items in this section were tallied according to the number of students choosing each strategy per item, and the number of students choosing strategies already taught to the class vs. number choosing strategies not yet taught. It was assumed that choice of an unfamiliar strategy would more often indicate lack of attention to the demands of the text, with some exceptions. The total possible points on Form A was 12.

Form B, consisting of 5 short answer and fill-in items and requiring a specified number of responses, as indicated by blanks labeled a,b,c,d, was assigned one point per correct response. Incorrect or "inappropriate" answers were tallied separately. Since a desired number of

responses per item were specified, the total possible points on Form B was 13.

Form C, composed of 5 open-ended, short answer and fill-in items and requiring no specified number of responses for three items, was assigned one point per correct response. Incorrect and inappropriate responses were also tallied separately. The total possible points on Form C was at least 9, if the student gave at least one response per inquiry. However, an unlimited number of points were possible since open-ended items without sub-designations (a,b,c, etc.) allowed for an unlimited number of multiple responses.

The answer key, used to determine correct and incorrect responses, was derived from the established descriptions of each content area chapter as detailed in Table 1. Where students' responses were unique to the established categories, such responses were recorded, determined to be either correct, incorrect, appropriate, or inappropriate, and scored accordingly.

## Results

### Recognition to Recall

In the first quarter, containing three instructional cycles and a single exposure to each form of the study questionnaire, the results of students' responses

were as follows. The highest number of correct responses on Form A (recognition) out of a possible 12 points was 9, achieved by 21% of the group. The lowest number of correct responses was 5, scored by 11% of the group.

Results of Form B (recall) responses were as follows. The highest number of correct responses was 13 out of a possible 13, scored by 4% of the group. The lowest was 3, scored by 4% of the group.

Results of Form C (recall) scores were a high of 16 points, exceeding a possible 9 points for 9 specified requests, scored by 5% of the group, and a low score of 4 points, also scored by 5% of the group.

In the second quarter, containing five instructional cycles, with two trials on Form A (recognition), one exposure to Form B (recall), and two for Form C (recall) the results were as follows. Form A1 (recognition) scores indicate the highest total of 12, out of a possible 12 points, for 11% of the group. The lowest total, 5 points, was scored by 5%.

Form A2 (recognition) scores reflect the highest total of 10 points for 20% and the lowest score, 8 points, for 20% of the group.

Form B1 (recall) scores indicate the high score, 11, for 5% and the low score, 2, also for 5% of the group.

Form C1 (recall) responses show a top score of 23 for 4% and a bottom score of 6 for 4% of the group.

Table 2 Frequency of Scores for Recognition (A,A1,A2) and Recall (B, B1, C, C1, C2)

First Quarter

| Scores | Form A | Form B | Form C |
|---|---|---|---|
| 3 | | * | |
| 4 | | | * |
| 5 | ** | ** | * |
| 6 | ** | * | ** |
| 7 | ******* | ****** | * |
| 8 | *** | * | **** |
| 9 | **** | *** | ** |
| 10 | | ** | ** |
| 11 | | *** | **** |
| 12 | | ***** | ** |
| 13 | | * | * |
| 14 | | | ** |
| 15 | | | * |
| 16 | | | |

Second Quarter

| | Form A1 | A2 | B1 | C1 | C2 |
|---|---|---|---|---|---|
| 2 | | | * | | |
| 3 | | | ** | | |
| 4 | | | * | | |
| 5 | * | | * | | |
| 6 | | | * | * | |
| 7 | ** | | * | | |
| 8 | **** | * | **** | | |
| 9 | ****** | *** | **** | * | |
| 10 | ** | * | ** | ***** | * |
| 11 | ** | | * | ***** | *** |
| 12 | ** | | | **** | *** |
| 13 | | | | * | * |
| 14 | | | | * | * |
| 15 | | | | * | **** |
| 16 | | | | * | *** |
| 17 | | | | | |
| 18 | | | | | * |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | * | |
| 24 | | | | | |
| 25 | | | | | |
| 26 | | | | | |
| 27 | | | | | * |

Table 3 Mean Scores and Standard Deviations for Recognition and Recall of Organizational Aids

| Form/Condition | n | M | SD |
|---|---|---|---|
| A /Recognition | 18 | 7.3 | 1.27 |
| B /Recall | 25 | 8.9 | 2.71 |
| C /Recall | 23 | 9.8 | 3.20 |
| A1/Recognition | 19 | 9.0 | 1.76 |
| A2/Recognition | 5 | 9.0 | 0.70 |
| B1/Recall | 18 | 7.2 | 2.70 |
| C1/Recall | 21 | 11.9 | 3.32 |
| C2/Recall | 18 | 14.4 | 3.86 |

Form C2 (recall) responses indicate a top score of 27 by 5% and a low score of 10 by 5% of the group. The total distribution of scores for each cycle in the first and second quarter is given in Table 2.

In the first quarter, the mean score for the first cycle was 7.27 and the mean for the last cycle was 9.78. In the second quarter, the mean for the first cycle was 9.00 and the mean for the last cycle was 14.38. Means and standard deviations for each cycle in the first and second quarter are given in Table 3.

Appropriate vs. Inappropriate Strategy Selection

Of students receiving the four highest and four lowest scores on Forms B, B1, C, C1, and C2 (recall), a comparison of frequencies of selected strategies indicates that high scorers chose active study strategies more often than low scorers, overall. Comparisons of frequencies also indicate that, although high and low scorers both selected some passive study strategies, low scorers selected passive strategies more often than high scorers. However, active strategies were more popular than passive strategies among both groups. Finally, the distribution of frequencies show an increase in the choice of active strategies and a decrease in the selection of passive strategies from the first to the last instructional cycle. (See Table 4)

Table 4 Frequencies of Active vs. Passive Strategies Selected by High and Low Scorers

| | Form B | Form C | Form B1 | Form C1 | Form C2 |
|---|---|---|---|---|---|
| **High Scorers** | | | | | |
| Active | 20 | 19 | 7 | 23 | 32 |
| Passive | 10 | 3 | 1 | 5 | 5 |
| **Low Scorers** | | | | | |
| Active | 5 | 11 | 5 | 29 | 4 |
| Passive | 14 | 6 | 2 | 10 | 2 |

Actualization of Selected Strategies

In the second week of the fourth and fifth instructional cycles, after students had each content area chapter in their possession for one week, students were asked to show evidence of executing at least two out of four of the study strategies which they had selected in response to the Study Questionnaire (Forms C1 and C2). In the fourth cycle, 65% of the group had begun to use at least two of the strategies which they had listed on Form C1. In the fifth cycle, 52% of the group showed evidence of using at least two of the strategies which they had listed on Form C2.

* Results reported for Form A2 are limited to 5 subjects due to unanticipated scheduling of students for other purposes when materials were distributed. However, for the purposes of this study, the discrepancy in group size does not affect the final analyses, since there were subsequent forms administered.

## Discussion

A comparison of students' responses to recognition formats (true/false and multiple choice) in the first and second quarter show increased accuracy in the identification of target details. Responses to the least structured recall formats (open-ended short answer) at the end of each quarter show increased ability to produce detailed protocols of the presence or absence of organizational aids in texts. In spite of the wide range of ability levels within the group, signifigant improvements were achieved overall. Comparison of the mean scores of recognition responses and recall responses to identification tasks appear to indicate that repeated trials of the self-questioning approach enhanced awareness of organizational aids in content area texts.

There was a signifigant transfer of accuracy in responses from the recognition task questionnaire to the recall condition questionnaires. Students' awareness of organizational aids in texts was maintained and improved with repetition of the procedure.

Although students who were more accurate in their awareness of the presence or absence of organizational aids chose active study strategies more often than low scorers, the effectiveness and diversity in appropriate strategy selection increased for both groups. Overall, students' selection of passive strategies such as read, study, spend more time, look for important information, concentrate more,

and go over the main part, decreased. Selection of active strategies such as make a glossary, annotate, make charts, create questions/answeers, make concept cards, take notes, summarize, underline, and study with a partner, increased.

There was also a signifigantly greater increase of appropriate strategy selection among the low scorers as well as a greater decrease of inappropriate selections, as compared to the high scorers. In their strategy selections, students often decided to create a structure for study which was not provided by the text. For example, students frequently chose to create glossaries or questions/answers after indicating in identification responses that these aids were absent from the text. Most chapters did not provide glossaries and several chapters did not include review questions. (See Table 1 for aids provided in each chapter.)

A substantial percentage of students did show evidence of committing themselves to the study strategies which they selected and listed on the questionnaires. Perhaps, the request that students show evidence of their involvement in chosen strategies was a critical factor in the extent to which acitve strategies were used.

## Implications

The approach is generalizable, since it rests mainly on the premise that it guides the student to ask what is and what is not available in texts. Improvement in

scores on the questionnaires were demonstrated by responses to chapters in a variety of content areas. Where new content areas were examined in the second quarter, questionnaire response scores still increased markedly. It appears that the self-questioning procedure serves to engage the student in the logical selection of study strategies. Self-questioning of the presence and absence of organizational aids in texts can be used to foster the selection of active strategies -- those which need to be created to compensate for the absence of particular organizational aids.

The results of the study suggest that when self-questioning is recorded in questionnaire response format several constructive ends are accomplished. The questionnaire provides a self-monitoring instrument for the student, an assessment instrument for the teacher, and a logically deduced commitment which can be followed up by both student and teacher. Students can be taught to ask themselves appropriate questions that will lead to meaningful decisions about how to manipulate content area material, and teachers can use the students' questionnaire responses to make appropriate judgements about teaching and re-teaching study strategies.

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